

## Features

### Unregulated Converters

- UL/CSA and EN Safety certified
- EN-61010 for Test, Measurement and Lab Use
- EN-60601 for Medical Applications
- Reinforced Isolation 6.4kVDC or 8kVDC
- Optional Continuous Short Circuit Protected
- Compact SIP7 Package
- Efficiency to 88%
- Very Low Isolation Capacitance
- /X2 Version with >9mm Input/Output Clearance

#### Description

The RxxP2xxS\_D Series of DC/DC Converters are certified to UL/CSA-60950 and UL/CSA 60601. This makes them ideal for medical and safety applications where approved or reinforced isolation is required. The reinforced versions are also EN61010-1 certified for Lab Equipment. The /X2 version has an input/output clearance of more than 9mm.

#### Selection Guide

| Part Number<br>SIP 7 | Reinforced Isolation<br>(kVDC) | Input Voltage<br>(VDC) | Output Voltage<br>(VDC) | Output Current<br>(mA) | Efficiency Std<br>(%) | Max Capacitive Load <sup>(1)</sup> |
|----------------------|--------------------------------|------------------------|-------------------------|------------------------|-----------------------|------------------------------------|
| RxxP23.3S            | /R6.4 & /R8                    | 5, 12, 15, 24          | 3.3                     | 600                    | 72-78                 | 3300µF                             |
| RxxP205S             | /R6.4 & /R8                    | 5, 12, 15, 24          | 5                       | 400                    | 79-84                 | 1200µF                             |
| RxxP209S             | /R6.4 & /R8                    | 5, 12, 15, 24          | 9                       | 222                    | 80-87                 | 1200µF                             |
| RxxP212S             | /R6.4 & /R8                    | 5, 12, 15, 24          | 12                      | 167                    | 80-87                 | 680µF                              |
| RxxP215S             | /R6.4 & /R8                    | 5, 12, 15, 24          | 15                      | 132                    | 80-88                 | 680µF                              |
| RxxP23.3D            | /R6.4 & /R8                    | 5, 12, 15, 24          | ±3.3                    | ±300                   | 73-80                 | ±1500µF                            |
| RxxP205D             | /R6.4 & /R8                    | 5, 12, 15, 24          | ±5                      | ±200                   | 79-85                 | ±470µF                             |
| RxxP209D             | /R6.4 & /R8                    | 5, 12, 15, 24          | ±9                      | ±111                   | 80-87                 | ±470µF                             |
| RxxP212D             | /R6.4 & /R8                    | 5, 12, 15, 24          | ±12                     | ±85                    | 80-87                 | ±330µF                             |
| RxxP215D             | /R6.4 & /R8                    | 5, 12, 15, 24          | ±15                     | ±66                    | 80-88                 | ±330µF                             |

xx = Input Voltage. Other input and output voltage combinations available on request.

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. R05P205S/P, R05P205D/P

\* add Suffix "/X2" for single output with alternative pinout, e.g. R05P205S/X2, R05P205S/P/X2

\* add Suffix "/R6.4" or "/R8" for Reinforced Isolation, e.g. R05P205D/R6.4, R05P205S/P/X2/R8

#### Specifications (measured at $T_A = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

|                                    |                                                 |                |
|------------------------------------|-------------------------------------------------|----------------|
| Input Voltage Range                | ±10%                                            |                |
| Output Voltage Accuracy            | ±5%                                             |                |
| Line Voltage Regulation            | 1.2%/1% of $V_{in}$ typ.                        |                |
| Load Voltage Regulation            | 3.3, 5V output types                            | 15% max.       |
| (10% to 100% full load)            | other output types                              | 10% max.       |
| Output Ripple and Noise (20MHz BW) | 200mVp-p max.                                   |                |
| Operating Frequency                | 20kHz min. / 50kHz typ. / 85kHz max.            |                |
| Efficiency at Full Load            | 65% min. / 80% max.                             |                |
| Minimum Load = 0%                  | Specifications valid for 10% minimum load only. |                |
| Isolation Voltage                  | /R6.4 (tested for 1 second)                     | 6400VDC        |
|                                    | (rated for 1 minute**)                          | 3200VAC / 60Hz |
|                                    | /R8 (tested for 1 second)                       | 8000VDC        |
|                                    | (rated for 1 minute**)                          | 4000VAC / 60Hz |
| Isolation Capacitance              | 1.5pF min. / 10pF max.                          |                |
| Isolation Resistance               | 15 GΩ min.                                      |                |
| Short Circuit Protection           | 1 Second                                        |                |
| P-Suffix                           | Continuous                                      |                |

continued on next page

\*\*Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

## ECONOLINE

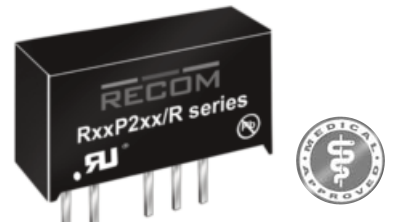
### DC/DC-Converter

with 3 year Warranty

# RECOM

## 2 Watt

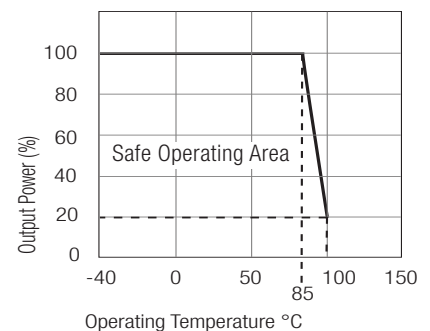
## SIP 7 Single & Dual Output



**EN-60950-1 Certified**  
**EN-60601-1 Certified**  
**UL/CSA 60950-1 Certified**  
**UL-60601 Certified**  
**EN-61010-1 Certified**  
**IEC-60601-1 CB Report**

# RxxP2xx/R

## Derating-Graph (Ambient Temperature)



Refer to Application Notes

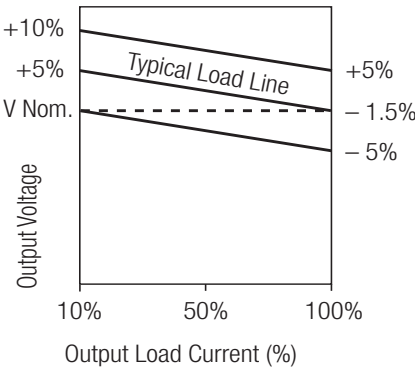
Specifications (measured at  $T_A = 25^{\circ}\text{C}$ , nominal input voltage, full load and after warm-up)

|                                                   |                                                              |                         |                                                |
|---------------------------------------------------|--------------------------------------------------------------|-------------------------|------------------------------------------------|
| Operating Temperature Range (free air convection) |                                                              |                         | -40°C to +85°C (see Graph)                     |
| Storage Temperature Range                         |                                                              |                         | -55°C to +125°C                                |
| Relative Humidity                                 |                                                              |                         | 95% RH                                         |
| Package Weight                                    |                                                              |                         | 4.3g                                           |
| Packing Quantity                                  |                                                              |                         | 25 pcs per Tube                                |
| Potting Material                                  |                                                              |                         | Silicone Rubber Compound (UL94V-0)             |
| MTBF (+25°C)<br>(+85°C)                           | Detailed Information see<br>Application Notes chapter "MTBF" | Reinforced              | 1154 x 10 <sup>3</sup> hours                   |
|                                                   |                                                              |                         | 168 x 10 <sup>3</sup> hours                    |
| Reinforced Isolation                              | Transformer Creepage                                         | /R6.4 Types             | 5.5 mm min.                                    |
|                                                   | Transformer Clearance                                        | /R6.4 Types             | 5.5 mm min.                                    |
|                                                   | PCB Creepage & Clearance                                     | /R6.4 Types             | 4.6 mm min.                                    |
| Certifications                                    |                                                              |                         |                                                |
| Measurement, Control and Laboratory Use Safety    |                                                              | Report: T1301251-313    | EN 61010-1 : 2010                              |
|                                                   |                                                              | Report: 2207629         | UL 60950-1 1st Edition<br>C22.2 No. 60950-1-03 |
|                                                   | UL/cUL Medical Safety                                        | Report: 314885-A5       | UL60601-1 1st Edition                          |
|                                                   | CSA Medical Safety                                           | Report: 2207629         | CAN/CSA-22.2 No 601.1-M90                      |
|                                                   | EN General Safety                                            | Report: SPCLVD1310079-1 | EN60950-1 : 2006                               |
|                                                   | CB/EN Medical Safety                                         | Report: CA-10169-A1-UL  | IEC/EN 60601-1 3rd Edition                     |
|                                                   |                                                              | Report: E314885-A5      | ES60601-1 3rd Edition                          |
| ANSI/AAMI Medical Safety                          |                                                              |                         |                                                |

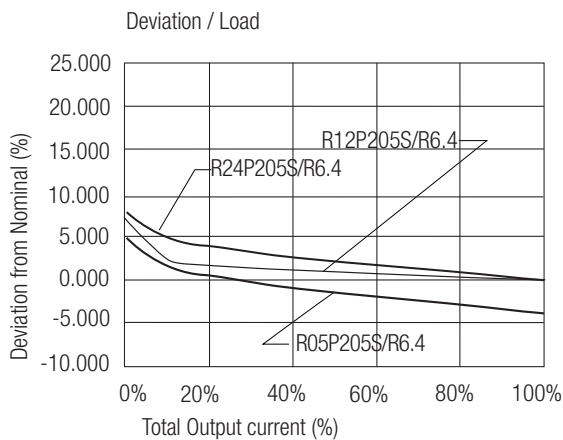
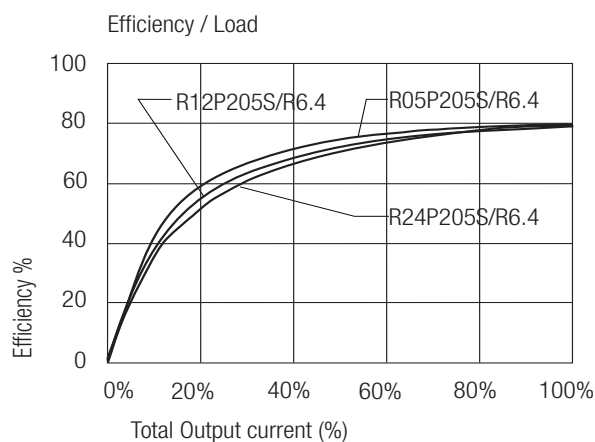
Notes

Note 1                      Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

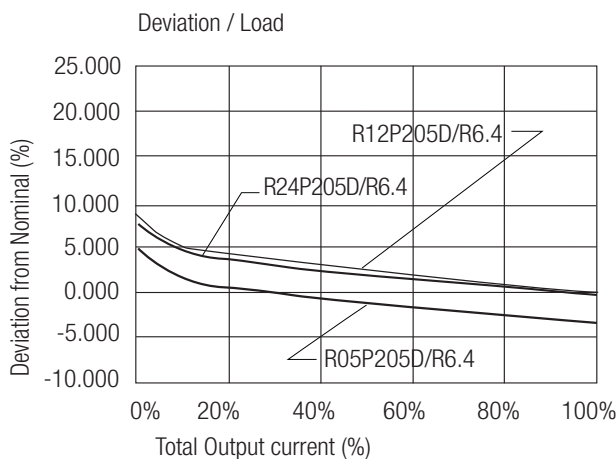
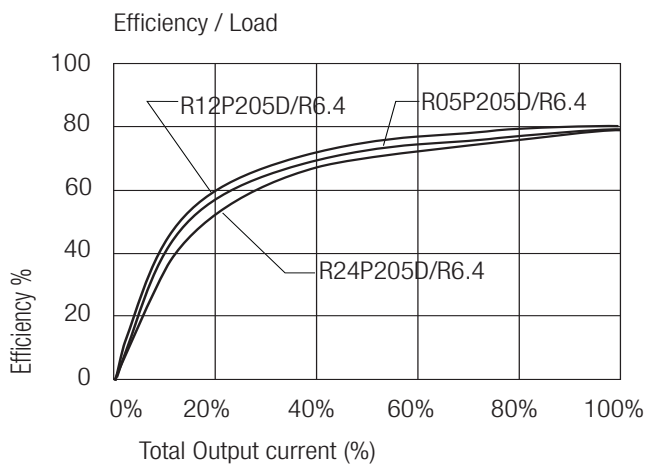
Tolerance Envelope



## RxxP205S/R6.4 RxxP205S/R8

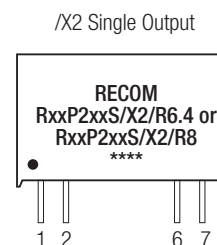
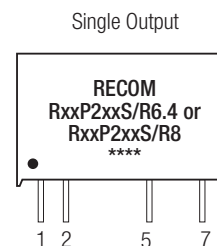
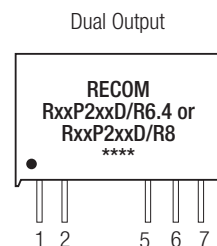
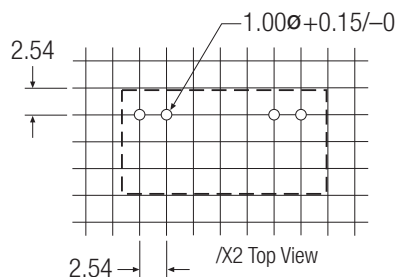
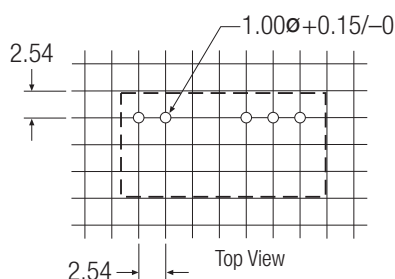
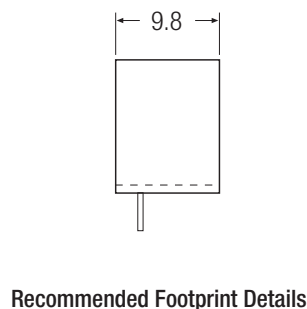
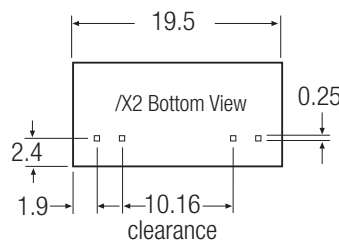
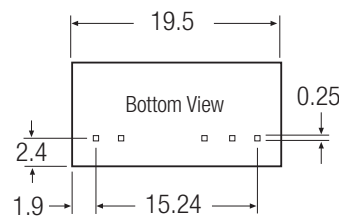
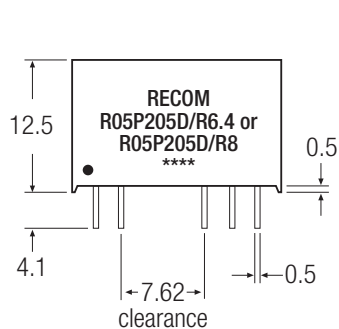


## RxxP205D/R6.4 RxxP205D/R8



### Package Style and Pinning (mm)

#### 7 PIN SIP Package



#### Pin Connections

| Pin # | Single | Dual  | /X2    |
|-------|--------|-------|--------|
| 1     | +Vin   | +Vin  | +Vin   |
| 2     | -Vin   | -Vin  | -Vin   |
| 5     | -Vout  | -Vout | No Pin |
| 6     | No Pin | Com   | -Vout  |
| 7     | +Vout  | +Vout | +Vout  |

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm